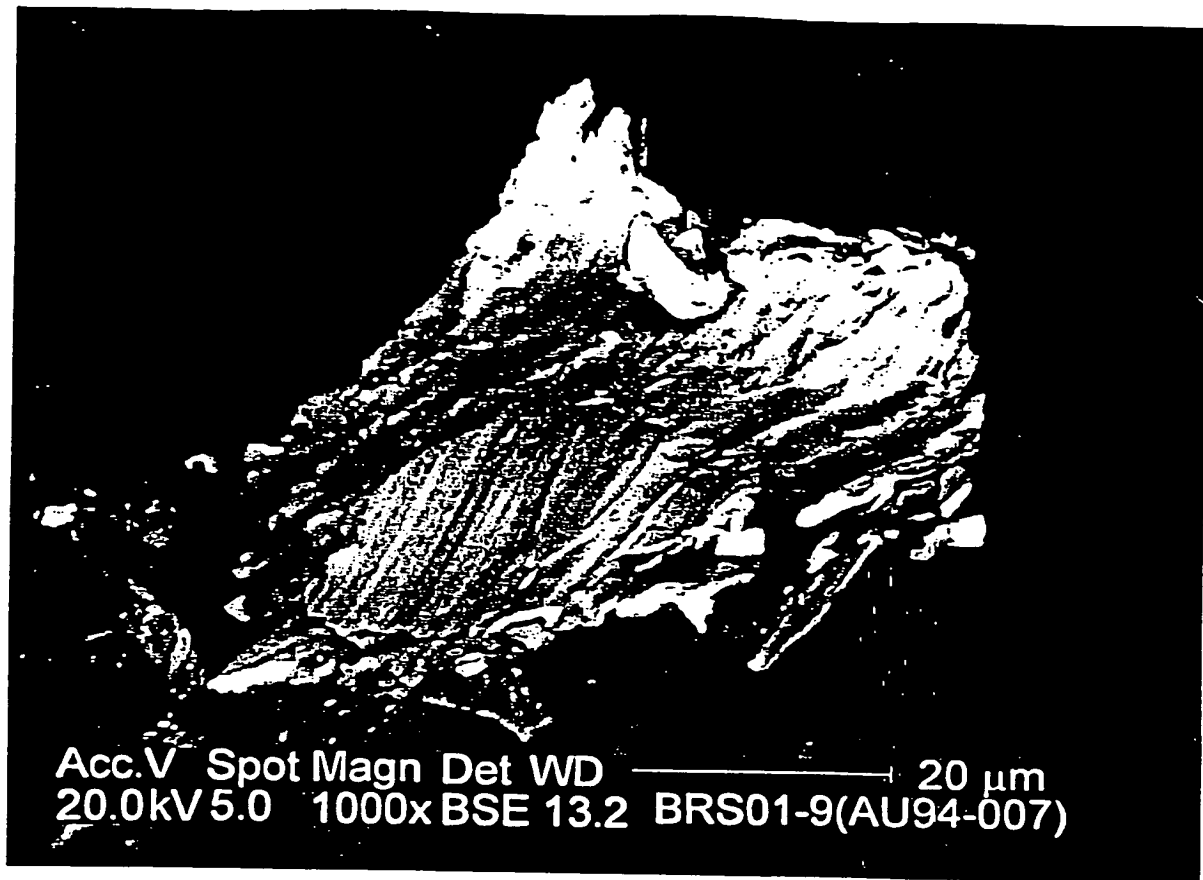


FIG. 1

*FIG. 2*

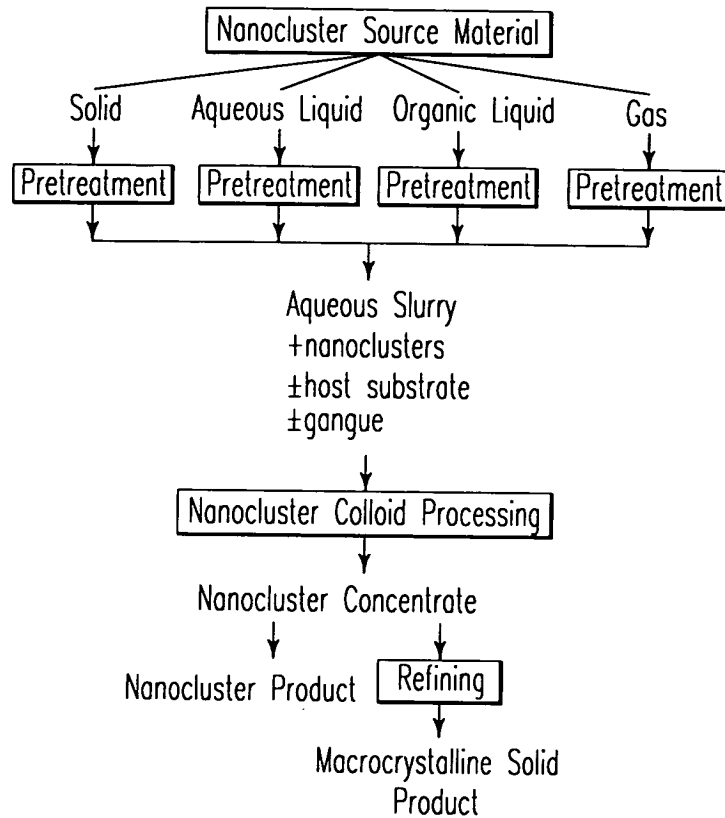


FIG. 3

FIG. 4A SOLID NANOCLUSTER SOURCE MATERIAL

- OP: PREVENT FROM DRYING
- CRUSH
- MILLING

↓ NANOCLUSTERS + HOST SUBSTRATE + GANGUE ± WATER

- SLURRY
- ⇒ TO NANOCLUSTER COLLOID PROCESSING

FIG. 4B AQUEOUS LIQUID NANOCLUSTER SOURCE MATERIAL

- OP: PREVENT FROM DRYING
 - ⇒ OP: TO NANOCLUSTER COLLOID PROCESSING
- PHASE SEPARATION

• WATER: to water treatment or recycle

↓ NANOCLUSTERS ± HOST-SUBSTRATE ± GANGUE

- SLURRY
- ⇒ TO NANOCLUSTER COLLOID PROCESSING



FIG. 4C ORGANIC LIQUID NANOCLUSTER SOURCE MATERIAL

- OP: PREVENT FROM DRYING
- PHASE SEPARATION
 - WATER: to aqueous liquid pretreatment, water treatment or recycle
 - ↓ ORGANIC LIQUID + NANOCLUSTERS ± HOST-SUBSTRATE
- PHASE SEPARATION
 - ORGANIC LIQUID: to hydrocarbon processing
 - ↓ NANOCLUSTERS ± HOST-SUBSTRATE ± GANGUE
- SLURRY
- ⇒ TO NANOCLUSTER COLLOID PROCESSING

FIG. 4D GASEOUS NANOCLUSTER SOURCE MATERIAL

- CONDENSOR
- SCRUBBER(S)
 - GAS: to gas processing
 - ↓ WATER + NANOCLUSTERS ± HOST-SUBSTRATE
- ⇒ OP: TO NANOCLUSTER COLLOID PROCESSING
- PHASE SEPARATION
 - WATER: to water treatment or recycle
 - ↓ NANOCLUSTERS ± HOST-SUBSTRATE
- SLURRY
- ⇒ TO NANOCLUSTER COLLOID PROCESSING



- NANOCLUSTERS ± HOST SUBSTRATE ± GANGUE ± WATER (from pretreatment)
 - OP: SLURRY CONDITIONING
 - OP: PHASE SEPARATION
 - WATER: to water treatment or recycle
 - ↓ ORGANIC LIQUID + NANOCLUSTERS + HOST-SUBSTRATE
 - COLLOID REGENERATION
 - GEL HYDRATION
 - COLLOID PEPTIZATION
 - OP: HEAT & PRESSURE TREATMENT
 - DISPERSION
 - NANOCLUSTER COLLOID DESORPTION
 - PHASE SEPARATION
 - DEPLETED HOST SUBSTRATE + GANGUE: to recycle or tailings
 - ↓ AQUEOUS NANOCLUSTER COLLOID SOLUTION
 - NANOCLUSTER COLLOID RECOVERY
 - PHASE SEPARATION, or
 - ADSORPTION
 - WATER: to water treatment or recycle
 - ↓ NANOCLUSTER CONCENTRATE
 - OP: REFINE
 - ↓ MACROCRYSTALLINE SOLID PRODUCT

FIG. 5

*FIG. 6*